

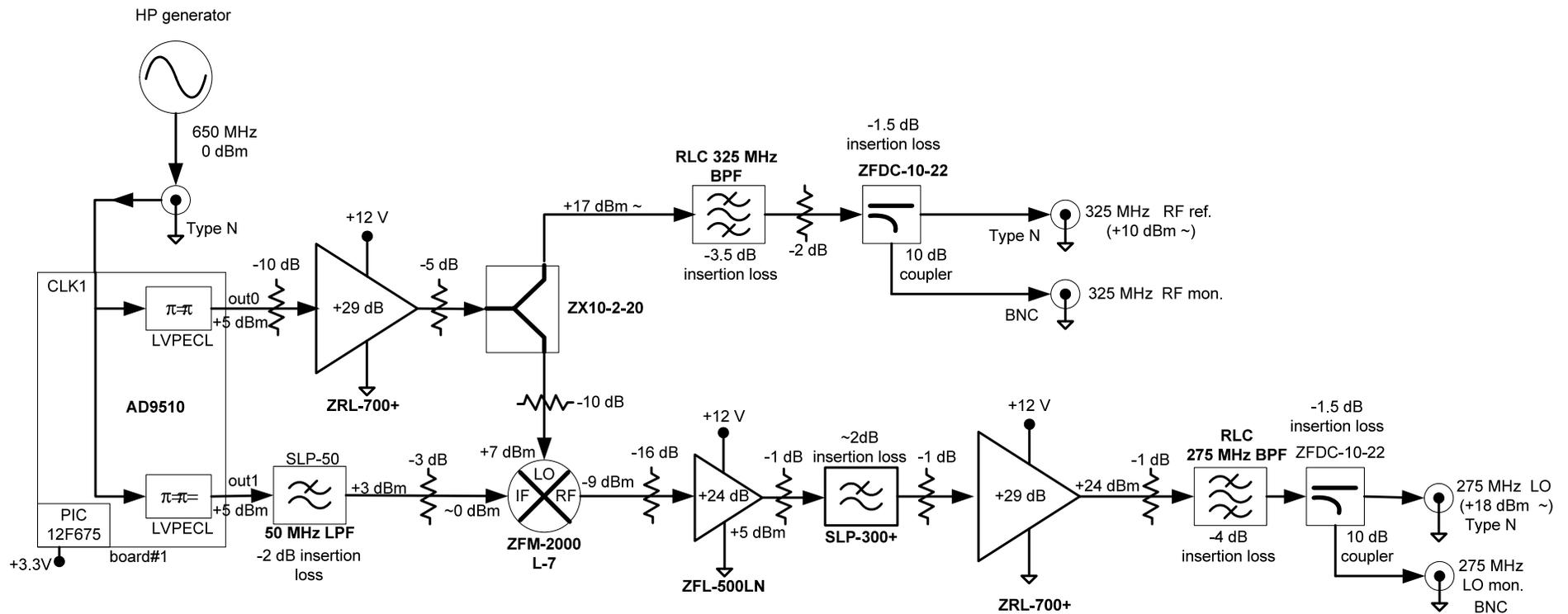
# HINS LLRF Status and Plans

Brian Chase

For the LLRF Group

# Current LLRF – SNS system

## Master Oscillator



# Current LLRF – SNS system



Master Oscillator / Local oscillator (275 MHz) generation

SNS receiver

VXI crate with SNS LLRF controller

650 MHz synthesizer (source for master oscillator)

# LLRF Timeline

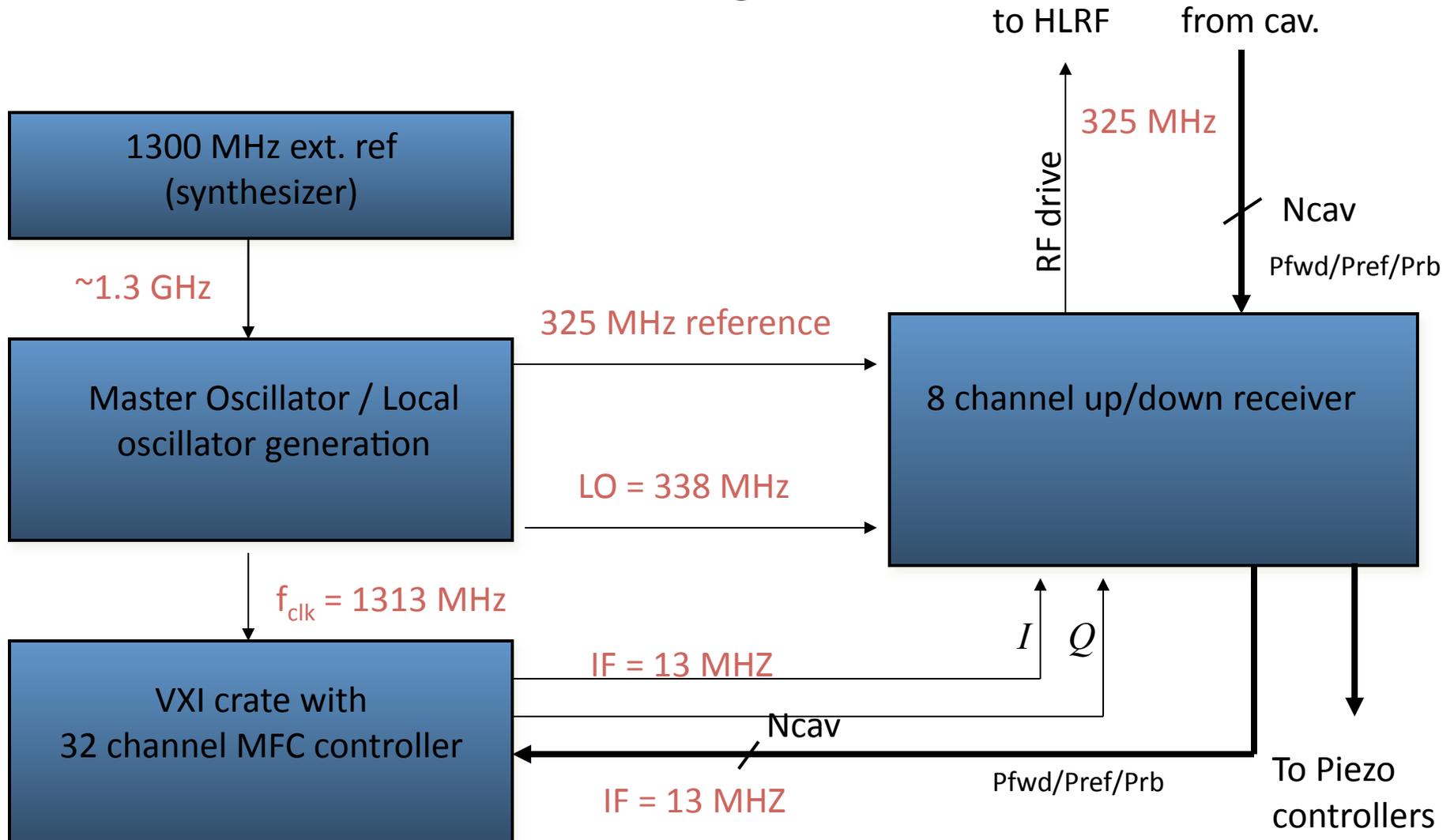
- Near term (ASAP- summer)
  - Support HINS test cave
    - Piezo studies
      - Supplying IF, triggers
    - FVM testing
- Fall 09
  - RFQ returns
- 6 cavity test -> 19 warm cavities

# LLRF Installation

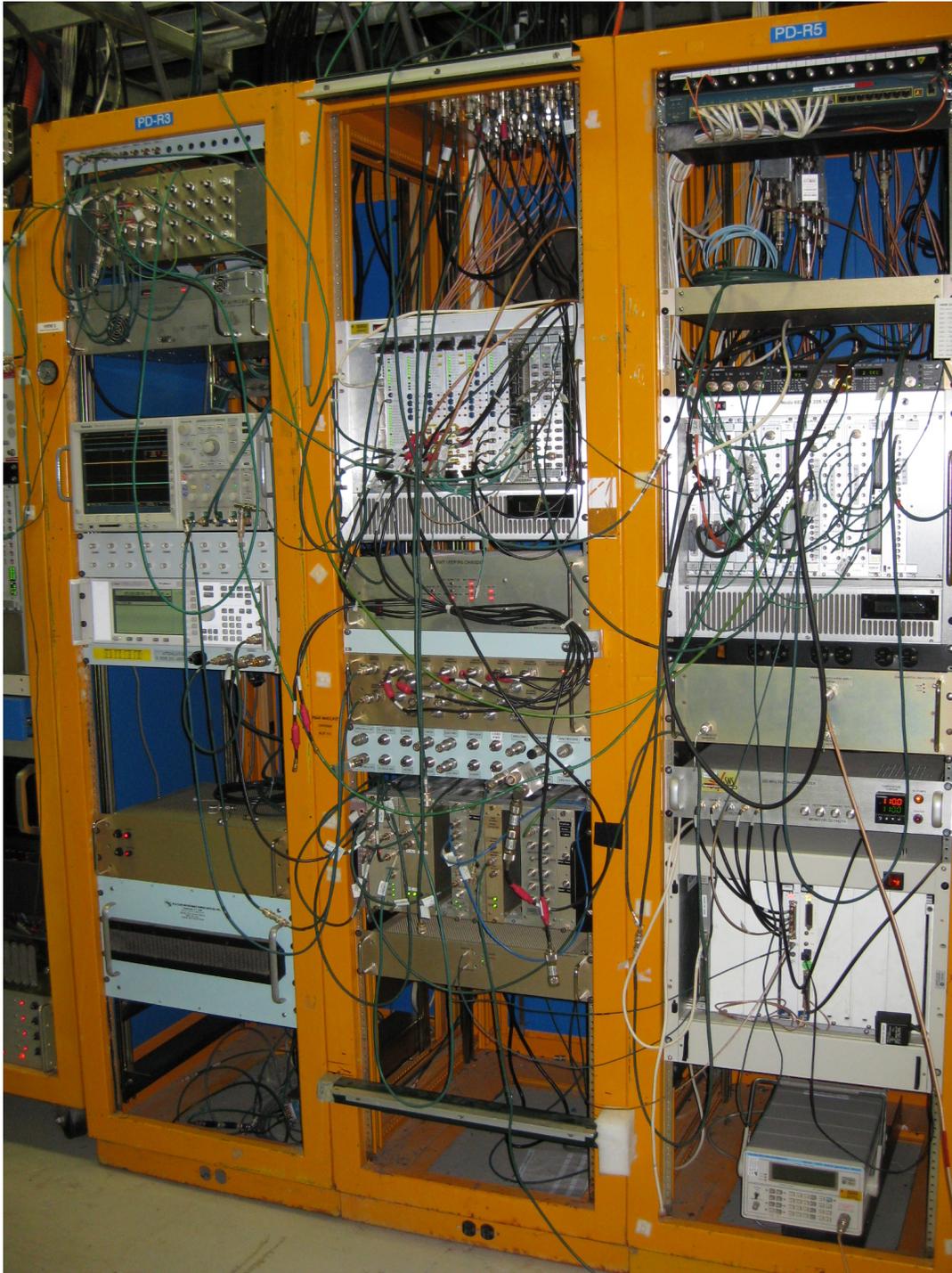
- Install new hardware
  - VXI crate with one MFC, slot 0 controller
  - 325 MHz Receiver and Transmitter and power supplies ( multi-cavity support)
  - Master Oscillator with 325 MHz RF Reference and 338 LO ( **August 10th**) Needed to support Piezo studies
  - Do we keep the SNS system for cross checking?
- Software
  - Matlab interface complete
  - Acnet/Labview in progress (**mid August**)
  - System tests when possible

# Proposed LLRF system

## Block diagram







### LLRF rack:

- moving up timing crate
- removing SNS LLRF system
- installing:
  - synthesizer
  - master oscillator
  - power supply
  - VXI crate (MFC + slot 0)
  - 8 channel receiver





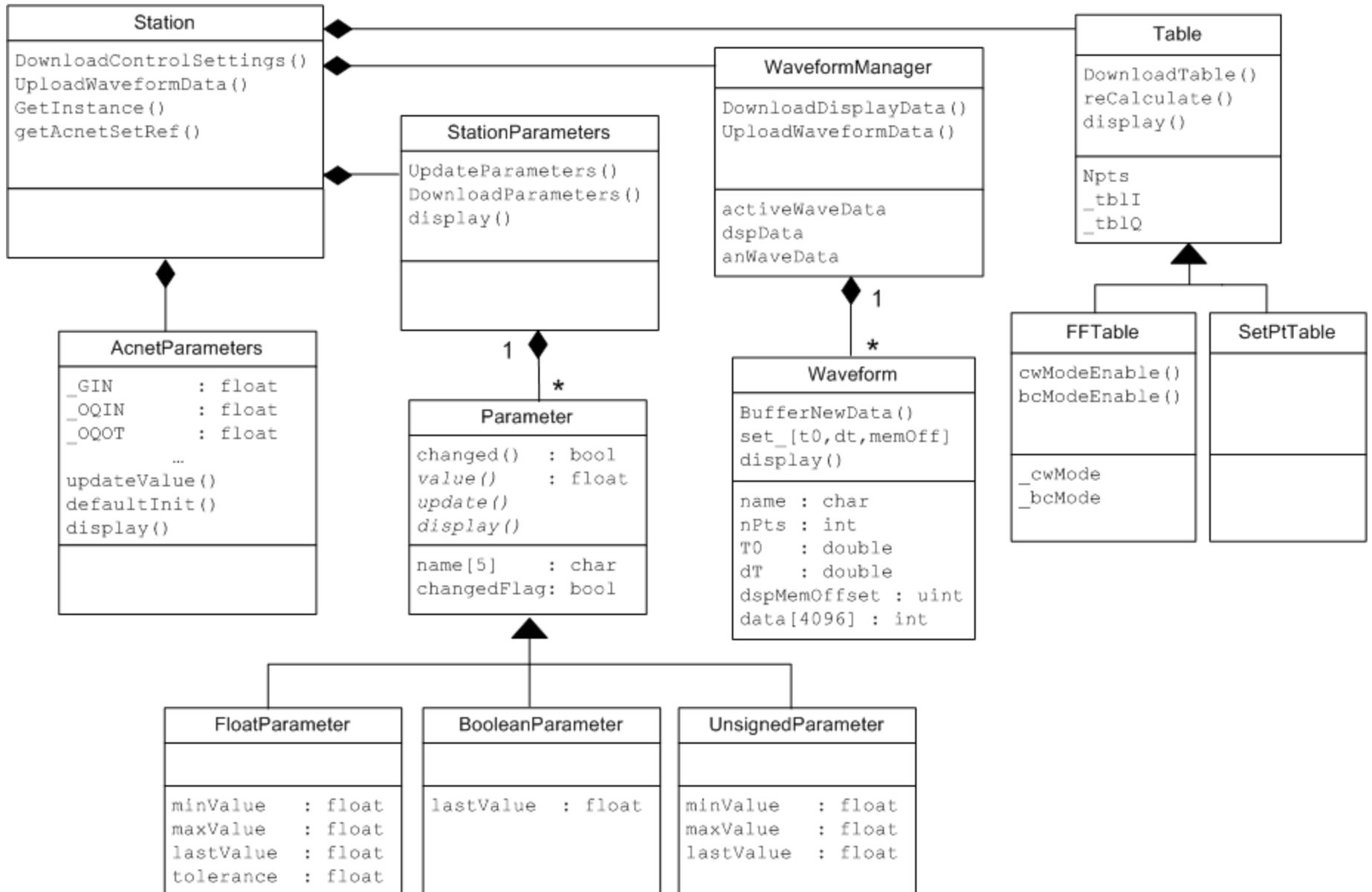
# FVM Studies

- Current setup
  - Matlab interface to control open loop ARB based regulation
  - Linearization of the system response
- Continue with current studies
  - Close feedback loop with FVM
    - MFC DACS drive waveform with amplifier stage
      - Firmware and hardware development
- High power studies with klystron and two cavities in cave

# Software Architecture I

- Front-End
  - Feedback/feed-forward control
  - Beam Compensation control
  - Table download and Waveform upload
  - Initial LabVIEW interface migrate to MOOC
- DSP
  - SHARC – floating point DSP for parameter scaling
  - FPGA – main feedback and feed-forward algorithm

# Software Architecture II



# Front-End Interface

**HINS LLRF** Back Door Status: Ok

Control | Table Data | Diagram | Expert

### Feedback/Feed-forward Compensation

Parameter	Value
Amplitude	1
Phase	4.5
Ratio	0.5
Tau	0.5
Delay Time (us)	0
Fill Time (us)	700
Flat-Top Time (us)	500
Proportional Gain	0.5
Integral Gain	0.5

Feedback:

Feed-forward:

### Beam Compensation

Parameter	Value
Start Time (us)	800
Amplitude	0.48
Pulse Width (us)	31
Phase	0

Beam Comp Switch:

### Amplitude Plot

Plot 0  Plot 1 

Amplitude vs Time (0 to 4500)

### Phase Plot

Plot 0  Plot 1 

Amplitude vs Time (0 to 4500)

QUIT